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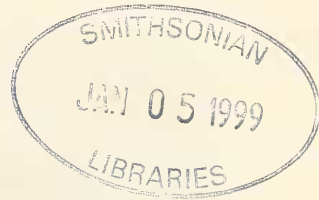
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Callionymid Fishes trawled off Wallis and Futuna,  
Central Pacific Ocean, with  
Descriptions of two New Species of *Callionymus*  
(Teleostei: Callionymidae)

By Ronald Fricke, Stuttgart

With 3 figures



Summary

Two new species of callionymid fishes are described from Wallis and Futuna, Central Pacific. They were trawled in 1992 on the deep shelf of Futuna Island. – *Callionymus futuna* n.sp. is a member of the *C.-kaianus*-group of the subgenus *Callionymus* (*Callionymus*) characterized by 9 rays in the second dorsal fin, 9 anal fin rays, a small antrorse barb and 2 large points dorsally on the preopercular spine, the male's caudal fin without long filaments (only with very short median filaments), both sexes with a large black blotch on the third spine and third membrane of the first dorsal fin, the anal fin with a small distal black margin, and the back with minute, partly dark-edged, white blotches. – *Callionymus sereti* n.sp. is a member of the *C.-japonicus*-group of the subgenus *Callionymus* (*Calliurichthys*) with 9 rays in the second dorsal fin, 8 rays in the anal fin, 6–8 small antrorse serrae dorsally on the preopercular spine, the male's first spine of the first dorsal fin with a long filament, the two median rays of the caudal fin extremely elongate in the male, the throat with a heart-shaped brown blotch in the male (but without lines), the first dorsal fin with a small black spot distally on the third spine, the female's first dorsal fin with a small black blotch distally on the third spine, and the head, body and fins pale.

Zusammenfassung

Zwei neue Fischarten der Familie Callionymidae werden aus Wallis und Futuna, Zentralpazifik, beschrieben. Sie wurden im Jahre 1992 auf dem unteren Kontinentalschelf von Futuna getrawlt. – *Callionymus futuna* n.sp. ist ein Mitglied der *C.-kaianus*-Artengruppe der Untergattung *Callionymus* (*Callionymus*) mit 9 Strahlen in der zweiten Rückenflosse, 9 Afterflossenstrahlen, einer kleinen antrorsen und 2 großen Spitzen dorsal auf dem Präoperkularhorn, der Schwanzflosse des Männchens ohne lange Filamente (nur mit sehr kurzen mittleren Filamenten), mit einem großen schwarzen Fleck auf der dritten Membran der ersten Rückenflosse bei beiden Geschlechtern, der Afterflosse distal schwarz, und dem Rücken mit kleinen weißen, teilweise schwarz gesäumten Flecken. – *Callionymus sereti* n.sp. ist ein Mitglied der *C.-japonicus*-Artengruppe der Untergattung *Callionymus* (*Calliurichthys*) mit 9 Strahlen in der zweiten Rückenflosse, 8 Afterflossenstrahlen, 6–8 kleinen antrorsen Spitzen

dorsal auf dem Präoperkulardorn, der ersten Rückenflosse des Männchens mit einem langen Filament, den mittleren beiden Schwanzflossenstrahlen des Männchens stark verlängert, der Kehle des Männchens mit einem braunen Fleck, aber ohne Linien, der ersten Rückenflosse beim Männchen mit einem kleinen schwarzen Fleck distal auf dem dritten Strahl, beim Weibchen mit einem schwarzen Fleck auf dem dritten Strahl und Teilen der zweiten Membran der ersten Rückenflosse, sowie Kopf, Körper und Flossen blaß, ohne Zeichnung.

## Contents

1. Introduction	2
2. Methods, materials and acknowledgments	2
3. Key to species of <i>Callionymus</i> from Wallis and Futuna area	2
4. Species descriptions	3
4.1. <i>Callionymus futuna</i> n.sp.	3
4.2. <i>Callionymus sereti</i> n.sp.	6
5. References	9

## 1. Introduction

The Callionymidae are a group of benthic fishes living on sand, mud or gravel bottoms of the upper 900 m of tropical, subtropical and temperate oceans. The Indo-Pacific species of the family have been revised by FRICKE (1983), who did not report a single species from Wallis and Futuna; subsequently, FRICKE (1993) published a revision of the Callionymidae of New Caledonia.

In 1992, several callionymid fish specimens were trawled on the shelf of Futuna Island, Wallis and Futuna, Central Pacific. The material from Wallis and Futuna comprises two species hitherto unknown to science, which are described in the present paper.

## 2. Methods, materials and acknowledgments

Methods follow FRICKE (1993). The standard length is abbreviated as "SL." The abbreviation "Ma" means "Million years before present." The data of the paratypes are given in parentheses if applicable.

Materials: The type materials are deposited in the Muséum National d'Histoire Naturelle, Paris (MNHN), and in the Staatliches Museum für Naturkunde Stuttgart (SMNS).

Acknowledgments: The author would like to thank Dr. B. SÉRET (MNHN), who made the callionymid fish specimens from Wallis and Futuna accessible to the author of the present paper, and donated two paratypes.

## 3. Key to species of the Callionymidae from Wallis and Futuna area

- 1a Preopercular spine dorsally with a small antrorse barb and two large, curved points; caudal fin normal, median rays not elongate, caudal fin not longer than prepectoral fin length; anal fin distally black ..... *Callionymus futuna* n.sp.
- 1b Preopercular spine dorsally with 6–8 minute antrorse serrae, but without large points; two median caudal fin rays extremely elongate in males, may be longer than SL; anal fin pale ..... *Callionymus sereti* n.sp.

## 4. Species descriptions

4.1. *Callionymus futuna* n.sp. (Fig. 1)

## Material

Total: 4 specimens.

Holotype: MNHN 1995-521, male, 78.9 mm SL, Futuna Island shelf, 14°13'30"S 178°10'18"W, 224–252 m depth, B. SÉRET, Cruise M7, St. CP 515, 12 May 1992.

Paratypes: MNHN 1995-522, 1 male, 74.2 mm SL, and 1 female, 69.4 mm SL, Futuna Island shelf, 14°19'30"S 178°04'30"W, 245–440 m depth, B. SÉRET, Cruise M7, St. CP 508, 11 May 1992. – SMNS 18823, 1 male, 81.5 mm SL, same data as MNHN 1995-522 (CP 508).

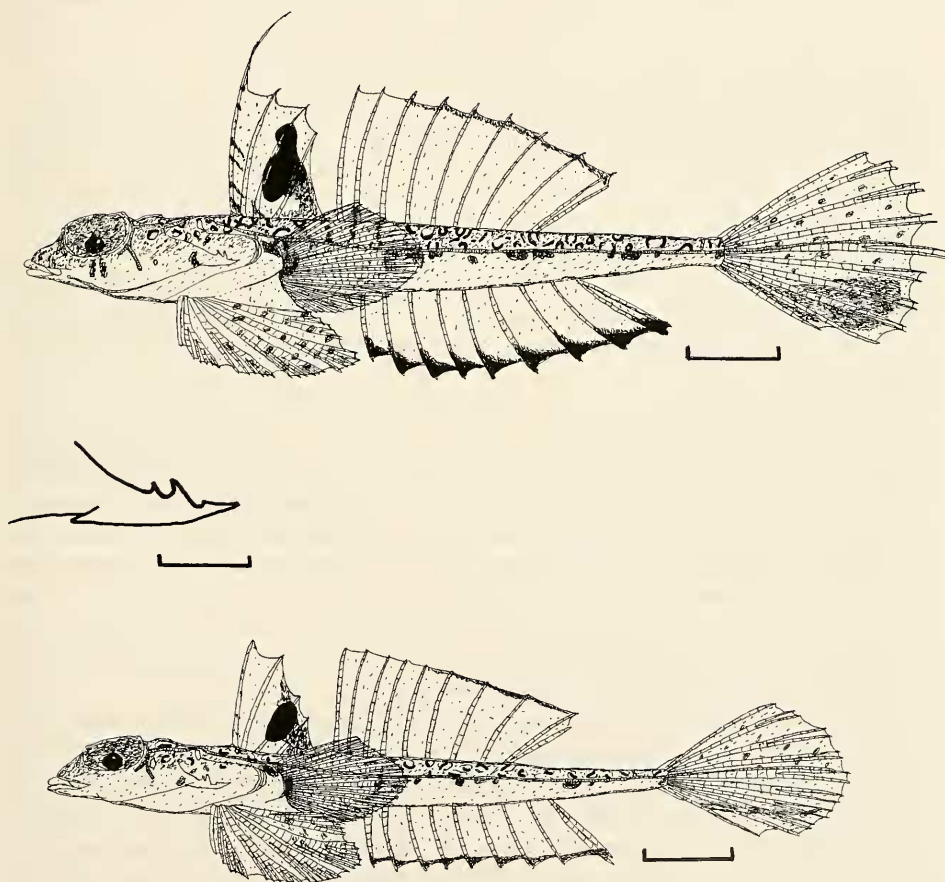


Fig. 1. *Callionymus futuna* n.sp.; holotype, MNHN 1995-521, male, 78.9 mm SL, Futuna Island Shelf. – Above: lateral view; scale indicates 10 mm. – Middle: left preopercular spine; scale indicates 3 mm. Paratype, MNHN 1995-522, female, 69.4 mm SL, Futuna Island Shelf. – Below: lateral view; scale indicates 10 mm.

### Diagnosis

A *Callionymus* of the *C.-kaianus*-group of the subgenus *Callionymus* (*Callionymus*) with 9 rays in the second dorsal fin, 9 anal fin rays, a small antrorse barb and 2 large points dorsally on the preopercular spine, the male's caudal fin without long filaments (only with very short median filaments), both sexes with a large black blotch on the third spine and third membrane of the first dorsal fin, the anal fin with a narrow distal black margin, and the back with minute, partly dark-edged, white blotches.

### Description

D<sub>1</sub> IV (IV); D<sub>2</sub> viii,1 (viii,1); A viii,1 (viii,1); P<sub>1</sub> ii,18,ii, total 22 (ii,16–18,ii, total 20–22); P<sub>2</sub> I,5 (I,5); C (i),i,7,ii,(i) [(i),i,7,ii,(i)].

Body elongate and depressed. Head depressed, 4.1 (4.0–4.2) in SL. Eye 2.3 (2.2–2.4) in head. Preorbital length 4.5 (3.5–3.9) in head. Interorbital distance 32 (26–38) in head. Upper jaw length 4.6 (3.4–4.6) in head. Preopercular spine length 3.6 (3.3–3.5) in head. Preopercular spine with an upcurved main tip, a small antrorse barb and two large curved points dorsally, a smooth convex ventral margin, and a strong antrorse spine at its base; preopercular spine formula  $1 \frac{3}{1}$ . Lateral line running from preorbital region to near end of fourth branched caudal fin ray; the lines of the opposite sides are interconnected between the eyes, across the predorsal region, and by a single commissure across the dorsal part of the caudal peduncle. A disconnected preoperculo-mandibular branch present. Body depth 8.9 (8.6–10.5) in SL. Body width 5.8 (5.7–6.7) in SL. Urogenital papilla in the male 24 (8–13) in head, in the female 22 in head. Caudal peduncle length 5.6 (4.4–5.0) in SL. Caudal peduncle depth 29 (28–33) in SL. Maximum observed SL 81.5 mm (male), 69.4 mm (female).

First dorsal fin high in the male, first spine filamentous, its length 4.0 (2.8–5.1) in SL, 2nd spine 5.2 (4.1–6.5) in SL, 3rd spine 5.5 (5.9–7.8) in SL, 4th spine 6.9 (6.2–8.9) in SL; lower in the female, without filaments, 1st spine 5.9 in SL, 2nd spine 5.7 in SL, 3rd spine 7.4 in SL, 4th spine 11.6 in SL. Predorsal (1) length 3.5 (3.4–3.7) in SL. Second dorsal fin rays unbranched, the last divided at its base. Second dorsal fin in the male distally slightly convex to convex. Second dorsal rays in the male at most with short filaments. First ray of second dorsal fin in the male 5.0 (4.3–5.4) in SL, 5th ray 5.3 (3.8–5.5) in SL, last ray 6.9 (6.3–7.7) in SL. Second dorsal fin in the female distally straight, 1st ray 5.6 in SL, 5th ray 7.3 in SL, last ray 7.5 in SL. Predorsal (2) length 2.3 (2.2–2.3) in SL. Anal fin beginning on a vertical through 2nd ray of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray in the male 10.2 (9.3–13.1) in SL, last ray 6.7 (5.9–7.2) in SL; 1st ray in the female 11.8 in SL, 5th ray 8.7 in SL, last ray 7.4 in SL. Preanal fin length 2.1 (2.0–2.1) in SL. Pectoral fin reaching to 2nd anal fin membrane when laid back. Pectoral fin length 4.9 (4.9–5.1) in SL. Prepectoral fin length 2.8 (2.7–2.9) in SL. Pelvic fin reaching to 1st anal fin membrane when laid back. Pelvic fin spine 14.6 (14.5–17.7) in SL; pelvic fin length 3.7 (3.7–3.8) in SL. Prepelvic fin length 4.5 (4.0–4.4) in SL. Median caudal fin rays in males with short filaments; caudal fin length in the male 3.2 (3.0–3.5) in SL, in the female 3.5 in SL.

Colour in alcohol. Head and body dorsally yellowish brown, ventrally whitish. Back with numerous dark brown half circles surrounding whitish spots. Sides of the

body with a row of triple dark brown blotches. Sides of head with a couple of dark brown spots. A dark blotch dorsally on the pectoral fin base.

First dorsal fin translucent, first ray with a number of short dusky streaks, third membrane with an elongate vertical black ocellus extending posteriorly to the base of the fourth membrane. Second dorsal fin pale, distal margin dusky. Anal fin translucent, with a narrow distal black margin. Caudal fin pale, lower part with a blackish streak or area; caudal fin dorsally with brown spots. Pelvic fin whitish, fourth and fifth rays distally with brown spots. Pectoral fin translucent, dorsally often with vertical rows of small brown spots.

Sexual dimorphism. Females have a much shorter filament on the first spine of the first dorsal fin than males, an overall less intensive colouration, and a short urogenital papilla.

#### Etymology

The new species is named for its type locality, Futuna Island.

#### Distribution

Known only from the type locality, Futuna Island Shelf, at Wallis and Futuna, Central Pacific. Probably also occurring in New Caledonia (see remarks). The species was trawled at depths of 224–440 m.

#### Relationships

*Callionymus futuna* n.sp. is a member of the *Callionymus-kaianus* species-group of the subgenus *Callionymus* (*Callionymus*), possessing a preopercular spine with a small antrorse barb close to the main tip, and additional large points on the dorsal side, and 9 rays each in the second dorsal and anal fins. It is closest to *Callionymus moretonensis* JOHNSON, 1971 (JOHNSON, 1971: 108–113, figs 1–2, South Queensland, as *Callionymus kaianus moretonensis*; FRICKE, 1981: 359–360, fig. 7, species-group revision; FRICKE, 1983: 223–226, fig. 65, revision, northern half of Australia, New Caledonia and New Ireland, 84–150 m depth, mud bottoms) from northern Australia, but differs in lacking caudal fin filaments (*C. futuna*: males only with several short median filaments; *C. moretonensis*: males with two long filaments), the longer filament in the first dorsal fin of large males (*C. moretonensis*: a short filament only), the distally convex second dorsal fin of males lacking dark central spots (*C. moretonensis*: distally straight, with 2 rows of central spots), and the row of triple blotches along the sides of the body (*C. moretonensis*: with a row of double blotches only). – *Callionymus futuna* differs from another species with triple blotches on the sides of the body, *Callionymus kaianus* Günther, 1880 (GÜNTHER, 1880: 44, pl. 19, fig. B, Kai Islands, 129 fms; FRICKE, 1981: 357–359, fig. 6, species-group revision; FRICKE, 1983: 170–174, fig. 50, revision, Indonesia: Kai Islands, 180–290 m depth, sand and mud bottoms) from eastern Indonesia, in lacking two median caudal fin filaments, the distally convex and distally dark second dorsal fin, the distally dark anal fin margin, and the shape of the preopercular spine (*C. kaianus*: largest dorsal point bearing a small basal barb). – It is distinguished from the Japanese species *Callionymus ochibaii* Fricke, 1981 in the distally convex second dorsal fin of the male, in the colouration of the male's second dorsal fin (*C. futuna*: distally dark, but without central dark blotches; *C. ochibaii*: distally pale, but with two rows of central dark blotches),

the broader body (*C. ochiaii*: body width 4.4–5.6 in SL; *C. futuna*: body width 5.7–6.7 in SL), and the longer and lower caudal peduncle (*C. ochiaii*: caudal peduncle length 5.3–6.1 in SL, depth 23–28 in SL; *C. futuna*: caudal peduncle length 4.4–5.6 in SL, depth 28–33 in SL).

#### Remarks

A specimen from New Caledonia (SMNS 12047) recorded by FRICKE (1981, 1983, 1993) under the name *Callionymus moretonensis* agrees with specimens of *Callionymus futuna* in having no caudal fin filament, a long main tip of the preopercular spine and triple spots along the sides of the body; however, it resembles *C. moretonensis* in having an anterior branch of the black blotch in the first dorsal fin. More material of the species from New Caledonia is needed to determine its status properly.

#### 4.2. *Callionymus sereti* n.sp. (Fig. 2)

##### Material

Total: 2 specimens.

Holotype: MNHN 1995-523, male, 58.9 mm SL, Futuna Island shelf, 14°19'30"S 178°04'18"W, 245–400 m depth, B. SÉRÉ, Cruise M7, St. CP505, 11 May 1992.

Paratype: SMNS 18824, 1 female, 57.1 mm SL, same data as holotype.

##### Diagnosis

A *Callionymus* of the *C.-japonicus*-group of the subgenus *Callionymus* (*Calliurichthys*) with 9 rays in the second dorsal fin, 8 rays in the anal fin, 6–8 small antrorse serrae dorsally on the preopercular spine, the male's first spine of the first dorsal fin with a long filament, the two median rays of the caudal fin extremely elongate in the male, the throat with a heart-shaped brown blotch in the male (but without lines), the first dorsal fin with a small black spot distally on the third spine, the female's first dorsal fin with a small black blotch distally on the third spine, and the head, body and fins pale, without additional markings.

##### Description

D<sub>1</sub> IV (IV); D<sub>2</sub> viii,1 (viii,1); A vii,1 (vii,1); P<sub>1</sub> ii,16,i–ii, total 19–20 (ii,16–17,ii, total 20–21); P<sub>2</sub> I,5 (I,5); C (i),i,7,ii,(i) [(i),i,7,ii,(i)].

Body elongate and slightly depressed. Head slightly depressed, 3.7 (3.6) in SL. Eye 2.6 (2.4) in head. Preorbital length in the male holotype 2.6 in head, in the female paratype shorter, 3.4 in head. Interorbital distance 45.0 (45.7) in head. Maxillary length 2.6 (2.8) in head. Lateral line running from preorbital region to near end of fourth branched caudal fin ray; the lines of the opposite sides are interconnected between the eyes, across the predorsal region, and by a single commissure across the dorsal part of the caudal peduncle. Preopercular spine length 3.8 (3.5) in head. Preopercular spine formula  $1 \frac{7-8}{1} 1 (1 \frac{6}{1})$ . Body depth 9.8 (7.6) in SL. Body width 5.9 (5.1) in SL. Urogenital papilla in the male holotype 15.8 in head, in the female not visible. Caudal peduncle length 6.0 (6.7) in SL. Caudal peduncle depth 22.6 (22.4) in SL.

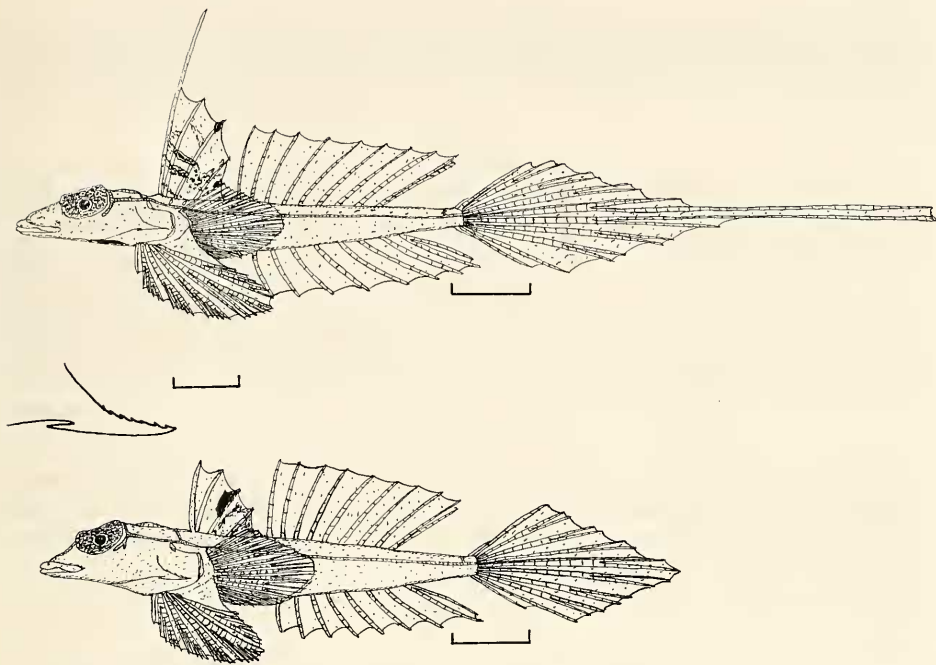


Fig. 2. *Callionymus sereti* n. sp.; holotype, MNHN 1995-523, male, 58.9 mm SL, Futuna Island Shelf. – *Above*: lateral view; scale indicates 10 mm. – *Middle*: left preopercular spine; scale indicates 3 mm. Paratype, SMNS 18824, female, 57.1 mm SL, Futuna Island Shelf. – *Below*: lateral view; scale indicates 10 mm.

First dorsal fin high in the male, first spine filamentous; first spine 2.3 in SL, 2nd spine 4.4, 3rd spine 4.9, 4th spine 7.8 in SL; in the female lower, without filaments, 1st spine 6.2 in SL, 2nd spine 7.0, 3rd spine 8.4, 4th spine 12.4 in SL. Predorsal (1) length 3.2 (3.0) in SL. Second dorsal fin distally straight; rays unbranched, the last divided at its base. First ray of second dorsal fin in the male 5.9 in SL, 5th ray 5.1 in SL, last ray 4.9 in SL; in the female, 1st ray 5.4 in SL, 5th ray 5.5 in SL, last ray 5.5 in SL. Predorsal (2) length 2.1 (2.0) in SL. Anal fin beginning on a vertical through 2nd membrane of second dorsal fin. Anal fin rays unbranched, the last divided at its base. First anal fin ray 11.1 (12.4) in SL, 5th ray 5.6 (7.2) in SL, last ray 5.6 (5.5) in SL. Pre-anal fin length 1.9 (1.8) in SL. Pectoral fin reaching to 2nd anal fin membrane when laid back. Pectoral fin length 4.8 (4.6) in SL. Prepectoral fin length 2.5 (2.5) in SL. Pelvic fin reaching to 2nd anal fin membrane when laid back. Pelvic fin spine 14.4 (15.0) in SL; pelvic fin length 3.0 (3.5) in SL. Prepelvic fin length 3.8 (3.9) in SL. Median two rays of caudal fin extremely elongate in the male, 0.93 in SL; in the female shorter, 2.1 in SL.

Colour in alcohol. Head, body and fins pale. Eye dark grey. Throat in male with a heart-shaped dark brown blotch, but without lines. First dorsal fin in the male with about 4 oblique basal dark brown lines and additional basal marblings; distal end of third spine with a black spot. First dorsal fin in the female with a black blotch distally on the third spine, and brown marblings on the third and fourth membranes.

Sexual dimorphism. The male differs from the female in the much longer caudal fin, the longer and filamentous first spine of the first dorsal fin, the different colouration of the first dorsal fin and of the throat, and a longer urogenital papilla (not visible in females).

#### Etymology

This new species is named in honour of Dr. BERNARD SÉRET (Paris), who collected the callionymid fishes from Futuna Island Shelf.

#### Distribution

The new species is known only from the type locality, on the shelf of Futuna Island, Wallis and Futuna. It was trawled at a depth of 245–400 m.

#### Relationships

*Callionymus sereti* n.sp. is a member of the *Callionymus-japonicus* species-group of the subgenus *Callionymus* (*Calliurichthys*). With the closely allied *Callionymus gardineri rivatoni* from New Caledonia, it shares the single filament in the male's first dorsal fin, but differs in the male's much longer caudal fin (1.5–1.6 in SL in *C. gardineri rivatoni*), the pale colouration of the body and the fins, and in the much

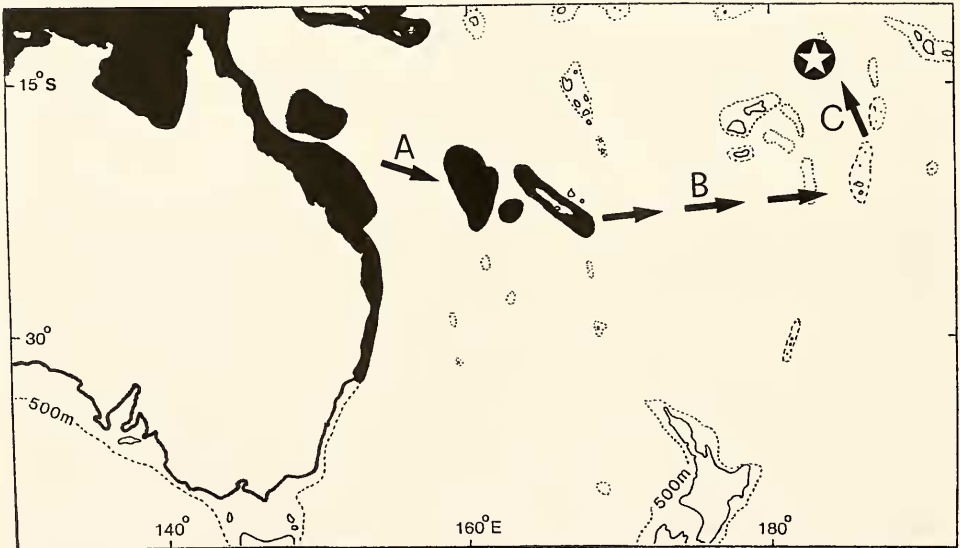


Fig. 3. Geographical distribution of the *Callionymus-kaianus* and *Callionymus-japonicus* species-groups in the Southwest Pacific. – The star shows the isolated distribution area of *Callionymus futuna* and *C. sereti* at Futuna Island. The distribution area of the remaining species is shown solid black. – Arrows indicate tectonic transport of: (A) Australian shelf material to New Caledonia at 74–52 Ma, forming Norfolk Ridge; (B) New Caledonian shelf material (E'ua Island shelf) out to the Tonga Ridge at 41–25 Ma; (C) contact of the northern Tonga Ridge with Wallis and Futuna at 3.0–1.5 Ma. – Scale bar: 1000 km.



smaller black spot on the first dorsal fin (crossing most of the second membrane in *C. gardineri rivatoni* males, on the second and third membranes in *C. gardineri rivatoni* females).

### Remarks

The finding of two continental shelf type species of *Callionymus* at the remote islands of Wallis and Futuna, northeast of Fiji, most closely related to New Caledonian species, is quite surprising (Fig. 3). There has been no land bridge between the Australian/New Caledonian continental shelf areas and Wallis and Futuna. Recent findings in Southwest Pacific plate tectonics, however, indicate that parts of the New Caledonian continental shelf ridge separated from southern New Caledonia at 39.5 Ma, were transported east across the Southwest Pacific, forming the island of E'ua in the Tonga Group at 25 Ma. Later, at 4.5 Ma, Wallis and Futuna came in close contact with the northern part of that group (YAN & KROENKE, 1993). EWART (1988) found closely related species of cicadas living in Tonga and New Caledonia, but not around island groups in between, supporting transport of faunal elements by this E'ua connection. The same transportation mode may have occurred in callionymid fishes.

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